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(71) Applicant *(for all designated States except US)*: **NORTH CAROLINA STATE UNIVERSITY** [US/US]; 2401 Research Drive, Suite 1122, Campus Box 8210, Raleigh, NC 27695-8210 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **JOHNSON, Mark, Alan, Lamonte** [US/US]; 1023 West South Street, Raleigh, NC 27603 (US). **BARLAGE, Douglas, William** [US/US]; 2809 Montcastle Court, Durham, NC 27705 (US). **MUTH, John, Franklyn** [US/US]; 115 Beasley Court, Cary, NC 27513 (US).

(74) Agent: **WILSON, Jeffrey, L.**; Jenkins, Wilson & Taylor, P.A., University Tower, Suite 1400, 3100 Tower Boulevard, Durham, NC 27707 (US).

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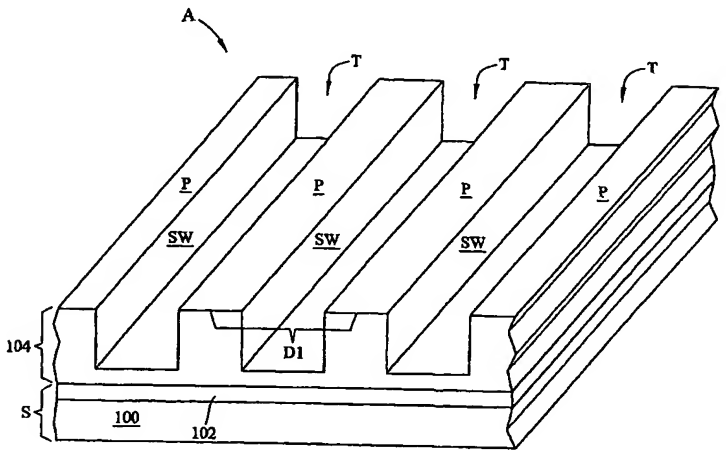
(54) Title: METHODS FOR NANOSCALE STRUCTURES FROM OPTICAL LITHOGRAPHY AND SUBSEQUENT LATERAL GROWTH



(57) Abstract: Methods, and structures formed thereby, are disclosed for forming laterally grown structures with nanoscale dimensions from nanoscale arrays which can be patterned from nanoscale lithography. The structures and methods disclosed herein have applications with electronic, photonic, molecular electronic, spintronic, microfluidic or nano-mechanical (NEMS) technologies. The spacing between laterally grown structures can be a nanoscale measurement, for example with a spacing distance which can be approximately 1-50 nm, and more particularly can be from approximately 3-5 nm. This spacing is appropriate for integration of molecular electronic devices. The pitch between posts can be less than the average distance characteristic between dislocation defects for example in GaN ($\rho = 10^{10}/cm^2 \rightarrow d = 0.1\ \mu m$) resulting an overall reduction in defect density. Large-scale integration of nanoscale devices can be achieved using lithographic equipment that is orders of magnitude less expensive that that used for advanced lithographic techniques, such as electron beam lithography.

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